What is claimed is:

1. An apparatus for enabling acousto-optic communication from water to air comprising:

an acoustic projector positionable below a surface of the water;

an optical interrogation beam transmitter to transmit an interrogation beam from the air toward the surface of the water;

an optical interrogation beam receiver to receive a reflection of the interrogation beam from the surface of the water;

an interferometer joined to said optical interrogation beam transmitter and said optical interrogation beam receiver to measure differences between said interrogation beam and said reflection of the interrogation beam; and

a signal converter joined to said interferometer to receive said measured differences and provide an electrical signal corresponding to said measured differences.

2. The apparatus of claim 1 wherein said optical interrogation beam transmitter is a laser.

3. The apparatus of claim 2 further comprising a beam splitter joined in communication with said optical interrogation beam transmitter and said interferometer, said beam splitter splitting off a portion of said interrogation beam to provide to said interferometer.

4. The apparatus of claim 3 wherein said interferometer is a laser Doppler vibrometer.

5. The apparatus of claim 1 further comprising a signal processor joined to said acoustic projector to provide a signal to the acoustic projector.

6. The apparatus of claim 5 wherein said signal is translated into a scheme selected from the group consisting of multi-frequency shift keying, M-ary phase shift keying, and M-ary quadrature amplitude modulation.

7. The apparatus of claim 6 further comprising a telemetry receiver joined to said signal converter to receive the electrical signal and translate the electrical signal back into the original signal.

8. A method for transferring a signal from below a water surface to air above the surface comprising the steps of:

transmitting an acoustic signal below the water surface to an acousto-optic interaction zone;

transmitting an optical interrogation beam from the air to the acousto-optic interaction zone;

receiving a reflection of said optical interrogation beam from the acousto-optic interaction zone;

comparing said transmitted optical interrogation beam with said reflection to obtain interferences; and

converting said interferences into an electrical signal.

9. The method of claim 8 further comprising the steps of:

providing a signal of interest below the surface prior to said step of transmitting;

modulating said provided signal with one modulation selected from a group consisting of multi-frequency shift keying, M-ary phase shift keying, and M-ary quadrature amplitude modulation; and

providing said modulated signal as said acoustic signal.

10. The method of claim 9 further comprising the step of demodulating said electrical signal to restore said signal of interest above the surface.

11. The method of claim 8 further comprising the step of splitting said transmitted optical interrogation beam into a first optical interrogation beam transmitted from the air to the acousto-optic interaction zone and a second optical interrogation beam provided as said transmitted optical interrogation beam for said step of comparing.